

REMARKS

1
2 In view of the following remarks, Applicant respectfully requests
3 reconsideration and allowance of the present application. This amendment is
4 believed to be fully responsive to all issues raised in the October 23, 2003, Office
5 action.

6 Applicants would like to thank the Office for the noted allowability of
7 claims 16 and 17.
8

Claims Rejected Under - 35 USC §112

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11 The Office has rejected claims 18, 27, 33, 37 and 38 under 35 U.S.C. 112,
12 second paragraph, "as being indefinite for failing to particularly point out and
13 distinctly claim the subject matter which applicant regards as the invention." In
14 particular, the Office states:
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16 A broad range or limitation together with a narrow range or
17 limitation that falls within the broad range or limitation (in the same
18 claim) is considered indefinite, since the resulting claim does not
19 clearly set forth the metes and bounds of the patent protection
20 desired. Note the explanation given by the Board of Patent Appeals
21 and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat.
22 App. & Inter. 1989), as to where broad language is followed by
23 "such as" and then narrow language. The Board stated that this can
24 render a claim indefinite by raising a question or doubt as to whether
25 the feature introduced by such language is (a) merely exemplary of

1 the remainder of the claim, and therefore not required, or (b) a
2 required feature of the claims. Note also, for example, the decisions
3 of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte*
4 *Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ
5 481 (Bd. App. 1949). In the present instance, claims 18, 27, 33, 37
6 and 38 recites the broad recitation “b-spline family”, and the claims
7 also recites “radial basis” which is the narrower statement of the
8 range/limitation. Why is the B-spline broad? Because does not
9 specify the type of B-spline (non-periodic/periodic/uniform/non-
10 uniform).

11
12 Claims 18 and 37 each depend from a claim which recites “defining a radial
13 basis function for each of the examples.” Claims 18 and 37 each narrow the
14 “radial basis functions” recited in their respective base claims by further reciting
15 “wherein the radial basis functions are selected from a b-spline family of radial
16 basis functions.”

17
18 Claims 27 and 33 each depend from a claim which recites “associating a
19 radial basis function with each example.” Claims 27 and 33 each narrows the
20 “radial basis functions” recited their respective base claims by further reciting
21 “wherein each radial basis function is selected from the b-spline family of radial
22 basis functions.”

23 37 CFR 1.75(c) states:
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1 One or more claims may be presented in dependent form, referring
2 back to and further limiting another claim or claims in the same
3 application.

4
5 Furthermore, as noted in the Manual of Patent Examining Procedure
6 (MPEP) (Eighth Edition), sec. 2173.05(c):

7 While a single claim that includes both a broad and a narrower may
8 be indefinite, it is not improper under 35 U.S.C. 112, second
9 paragraph to present a dependent claim that sets forth a narrower
10 range for an element than the range set forth in the claim from which
11 it depends. For example, if claim 1 reads “A circuit . . . wherein the
12 resistance is 75-150 ohms.” and claim 2 reads “The circuit of claim 1
13 wherein the resistance is 75-100 ohms.”, then claim 2 should not be
14 rejected as indefinite. (Emphasis added)
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16

17
18 Applicants would like to point out that each of claims 18, 27, 33, and 33
19 have just this form, where the broader statement of a “radial basis function” is
20 presented in the independent claims, and the radial basis function is further
21 narrowed in the dependent claim when it stated “wherein the radial basis
22 function(s) is/are selected from a b-spline family of radial basis functions.” That
23 is, contrary to the Office’s assertion noted above, the radial basis function(s) in the
24 dependent claims are narrower than the radial basis functions in the parent claims,
25

1 because the radial basis functions in the dependent claims are limited to only those
2 radial basis functions that are selected from a b-spline family of radial basis
3 functions.

4 Since each of dependent claims 18, 27, 33, and 33 properly further limit the
5 claims from which they depend, and since each of these further limitations is
6 presented in proper "wherein" form, it is respectfully requested that the 35 USC
7 §112, second paragraph rejections of claims 18, 27, 33, and 33 be withdrawn.
8

9 With respect to claim 38, Applicants would like to point out that claim 38
10 does not recite a radial basis function(s) is/are selected from a b-spline family of
11 radial basis functions. In fact, the term "b-spline" does not occur in claim 38. As
12 such, it appears that the inclusion of the rejection for claim 38 with 18, 27, 33, and
13 33, which is directed to the use of the term b-spline, was inadvertent. As such, the
14 Applicants respectfully request claims the rejection of claim 38 is withdrawn, or
15 that the Office clearly sets forth the reason(s) why claim 38 is being rejected.
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17
18 **Claims Rejected Under - 35 USC §102(a)**

19 Each of claims 1-15, 19-26, 28-32, 34-36, and 39-46 in the present
20 application stand rejected under 35 USC §102(a) as being anticipated by
21 Computer Graphic, Keith Waters, "A muscle Model for Animating Three-
22 Dimensional Facial Expressions," July 1987, Volume 21, number 4, pp 17-24
23 (hereinafter "Waters").
24
25

1 Before discussing the particular claim rejections, the Applicant would like
2 to generally discuss Waters and various systems and methods described and
3 claimed in the present application.

4 With respect to the present application, what is described therein involves
5 defining examples relative to an abstract space, the abstract space being defined by
6 at least an adjective or an adverb. Each adjective or adverb represents a separate
7 axis in this abstract space.

8 As described in the present application, adjectives characterize objects.
9 Some examples of adjectives include "gender," which may range in values along
10 its axis from male to female, the adjective "age," which may range in values along
11 its axis from old to young; and "elbow bend," which may range in values along its
12 axis from no bend to full bend.
13

14 As described in the present application adverbs characterize motions. Some
15 examples of adverbs include, for walking, the walker's mood, which may range in
16 values along its axis from happy to sad and the amount of slope the walker is
17 walking, which may range in values from flat to steep.
18

19 In accordance with various systems and methods described in the present
20 application, examples are provided that pertain to a shape or motion with respect
21 to an abstract space. For example, an abstract space may include an axis for gender
22 that includes values from male to female and an axis for age that includes values
23 that range from old to young, along with any number of other axes.
24
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1 As noted in the present application, once these examples have been defined
2 in the abstract space, the challenge is to ascertain mathematically how a shape or
3 motion that was not previously defined in the abstract space is going to look. In
4 accordance with various implementations described in the present application, the
5 non-defined shape or motion is determined by blending the previously selected
6 examples to produce a new example. One way this may be done is to interpolate
7 the new example from the defined examples.

8
9 With respect to Waters, what is described therein is a method for modeling
10 facial expressions using muscle models. That is, Waters describes creating various
11 facial expressions by changing the underlying muscles in a model of a face. With
12 respect to this muscle modeling, the Waters reference discusses such things as skin
13 elasticity and the effect the contraction of one model will have on another in this
14 muscle modeling.

15
16 Figs 15-22 of Waters show various individual facial expressions that can be
17 constructed using Waters muscle modeling. The facial expressions in Waters are
18 apparently each modeled separately from one another. There is no discussion
19 whatsoever in Waters of interpolating or blending existing facial expressions to
20 produce a new facial expression.

21
22 Figs. 4-14 of Waters show various conventional 2 and 3 dimensional
23 representations (i.e., non-abstract space) of various muscles. One figure, Fig. 10,
24 illustrates two muscles. With respect to this figure, Waters describes the
25

1 contraction of one muscle will have on the other muscle. What is not described is
2 blending or interpolating the two muscles to produce a third muscle.
3

4 Turning now to the claims of the present application rejected under 35 USC
5 §102(a), as noted in §706.02 of the Manual of Patent Examination Procedure
6 (MPEP), “To anticipate a claim, the reference must teach every element of the
7 claim.” As will now be described, it is Applicant’s position that each of rejected
8 claims 1-15, 19-26, 28-32, 34-36, and 39-46 are allowable for at least the reason
9 that Waters fails to teach every element of the claim.
10

11
12 **Claim 1** reads as follows:

13
14 1. A blending method comprising:

15 providing a set of examples that pertain to a shape or motion that is to be
16 animated, the examples being provided relative to a multi-dimensional abstract
17 space defined by at least one of an adjective and an adverb;

18 selecting a point within the multi-dimensional abstract space that does not
19 coincide with a point that is associated with any of the examples, the selected
20 point corresponding to a shape or motion within the abstract space;

21 computing a single weight value for each of the examples; and

22 combining the single weight values for each of the examples in a manner
23 that defines an interpolated shape or motion that is a blended combination of each
24 of the examples of the set of examples.
25

1 With respect to the “replacing” element recited in claim 1, it is stated in the
2 October 23rd Office action that:

3 Walters [sic] in Figs. 16-22 illustrates the step of “providing a set of
4 examples that pertain to a shape or motion that is to be animated, the
5 examples being provided relative to a multi-dimensional abstract
6 space defined by at least one of an adjective and an adverb,” and
7 also covers the limitation of abstract space (an adjective and an
8 adverb). In Figs. 16-22 illustrate a character can be set to happy or
9 sad or sleep or anywhere in between.

10 It appears from the quoted language that the Office is equating the heads of
11 Figs. 16-22 with the examples recited in claim 1. First, it is important to note that
12 the heads in Figs. 16-22 of Waters Figs. 16-22 do not pertain to a shape or motion
13 that is to be animated, as recited in claim 1. Rather, as noted on page 22 of Waters,
14 “The heads shown in Fig 15-22 were modeled using photographic techniques and
15 mirrored about the meridian of a face.” This is point is not trivial, since claim 1
16 recites defining an interpolated shape or motion that is a blended combination of
17 each of the examples of the set of examples. The heads in Waters are never
18 described as being used to produce another head. That is, the heads are not
19 described as starting point material for a process. Rather, they are the end result of
20 a process.

23 Additionally, the head drawings in Waters are not “provided relative to a
24 multi-dimensional abstract space defined by at least one of an adjective and an
25

1 adverb,” as recited in claim 1. Rather, they are provided relative to a standard
2 three-dimensional (“3-D”) space having height, width, and depth. Put simply, the
3 heads illustrated in Waters are objects in standard 3-D space that are the end result
4 of a process, while the examples of claim 1 are provided relative to a multi-
5 dimensional abstract space, and are the starting material for an interpolation
6 processes.

7 With respect to the “computing” element recited in claim 1, the Office
8 states that “Waters in Figs. 16-22 illustrates weighting values for each of the
9 examples.” With respect to the “combining” element of Waters the Office states:
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11 Walters [sic] in Figs. 16-22 illustrates the step of “combining the
12 single weight values for each of the examples in a manner that
13 defines an interpolated shape or motion that is a blended
14 combination of each of the examples of the set of examples.”
15

16 With respect to the “computing” step of claim 1, as noted above, it appears
17 that the Office is equating the heads of Figs. 15-22 of Waters with the examples of
18 claim 1. The Applicants can find no mention whatsoever in Waters that a single
19 weighting value is computed for each, or any, of the heads shown in Figs. 15-22,
20 as required by claim 1.

21 With respect to the “combining” step of claim 1, the Applicants can find no
22 mention whatsoever in Waters of combining single weighting values associated
23 with each of the heads in Figs. 15-22 in a manner that defines an interpolated
24 shape or motion, as required by claims 1.
25

1 Since Waters fails to teach or suggest all of the steps of claim 1, Waters
2 does not and cannot anticipate claim 1. Claim 1 is believed to be allowable over
3 Waters, and such allowance is respectfully requested.

4 **Claims 2-12** each depend in some form from claim 1. As such, each of
5 claims 2-12 is necessarily allowable Waters by virtue of this dependency. Each of
6 claims 2-12 also specifies additional features that are not disclosed by Waters.
7

8 **Claim 13** reads as follows:
9

10 13. A blending method comprising:
11 linearly approximating a degree of freedom that is associated with a new
12 form or motion that is to be rendered based upon a plurality of examples that
13 define respective forms or motions within an abstract space;
14 defining a radial basis function for each of the examples;
15 combining the linear approximation and the radial basis functions to
16 provide a cardinal basis function; and
17 using the cardinal basis function to render the new form or motion.
18

19 With respect to the "linearly approximating" step of claim 13, the Office
20 states:

21 Walter [sic] in Figs. 4-12 illustrates the step of, "linearly approximating a
22 degree of freedom that is associated with a new form or motion that is to be
23 rendered based upon a plurality of examples that define respective forms or
24 motions within an abstract space"
25

1 As previously noted, Waters does not describe forming a new form or
2 motion using other examples, either by linear approximation or otherwise. As
3 such, Waters does not and cannot describe the step of “linearly approximating a
4 degree of freedom that is associated with a new form or motion that is to be
5 rendered based upon a plurality of examples,” as recited in claim 13.

6 The “defining,” “combining,” and “using” steps of claim 13 each relate to a
7 manner in which the new form or motion is rendered. Since Waters does not
8 describe rendering a new form or motion based on a plurality of forms using
9 examples, Waters can not teach the “defining,” “combining,” and “using” steps of
10 claim 13.
11

12 Since Waters fails to teach or suggest all of the steps of claim 13, Waters
13 does not and cannot anticipate claim 13. Claim 13 is believed to be allowable over
14 Waters, and such allowance is respectfully requested.

15 **Claims 14-15 and 18-21** each depend in some form from claim 13. As
16 such, each of claims 14-15 and 18-21 is necessarily allowable Waters by virtue of
17 this dependency. Each of claims 14-15 and 18-21 also specifies additional features
18 that are not disclosed by Waters.
19

20
21 **Claim 22** reads as follows:

22 22. One or more computer-readable media having computer-readable
23 instructions thereon which, when executed by a computer, cause the computer to:
24
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1 linearly approximate a degree of freedom that is associated with a new form
2 or motion that is to be rendered based upon a plurality of examples that define
3 respective forms or motions within an abstract space, by deriving basis
4 hyperplanes that fit a least squares hyperplane to a case where one example has a
5 value of 1 and the remaining examples have values of 0;

6 account for residuals between the example values and the hyperplane by:
7 associating a radial basis function with each example;
8 ascertaining a radial basis weight value for each radial basis
9 function; and
10 scaling each radial basis function by its ascertained radial basis
11 weight value; and
12 sum the linear approximation and scaled radial basis
13 functions to provide a cardinal basis function.

14
15 As previously noted Waters does not describe “rendering a new form or
16 motion based on a plurality of examples that define respective forms or motions
17 within an abstract space.” As such, Waters does not and cannot describe the
18 “linearly approximate” step of claim 22.

19 Since Waters fails to teach or suggest all of the steps of claim 22, Waters
20 does not and cannot anticipate claim 22. Claim 22 is believed to be allowable over
21 Waters, and such allowance is respectfully requested.

22
23 **Claims 23-27** each depend in some form from claim 22. As such, each of
24 claims 23-27 is necessarily allowable Waters by virtue of this dependency. Each
25 of claims 23-27 also specifies additional features that are not disclosed by Waters.

1
2 **Claim 28** reads as follows:

3 28. A computerized blending system comprising:

4 at least one computer-readable media;

5 at least one processor;

6 instructions resident on the computer-readable media which, when executed
7 by the processor, cause the blending system to:

8 linearly approximate a degree of freedom that is associated with a
9 new form or motion that is to be rendered based upon a plurality of examples that
10 define respective forms or motions within an abstract space, by deriving basis
11 hyperplanes that fit a least squares hyperplane to a case where one example has a
12 value of 1 and the remaining examples have values of 0;

13 account for residuals between the example values and the hyperplane by:

14 associating a radial basis function with each example;

15 ascertaining a radial basis weight value for each radial basis
16 function; and

17 scaling each radial basis function by its ascertained radial basis
18 weight value; and

19 sum the linear approximation and scaled radial basis functions to provide a
20 cardinal basis function.

21
22 As previously noted Waters does not describe “rendering a new form or
23 motion based on a plurality of examples that define respective forms or motions
24 within an abstract space.” As such, Waters does not and cannot describe the
25 “linearly approximate” step of claim 22.

1 Since Waters fails to teach or suggest all of the steps of claim 22, Waters
2 does not and cannot anticipate claim 22. Claim 22 is believed to be allowable over
3 Waters, and such allowance is respectfully requested.

4 **Claims 29-33** each depend in some form from claim 28. As such, each of
5 claims 29-33 is necessarily allowable Waters by virtue of this dependency. Each
6 of claims 29-33 also specifies additional features that are not disclosed by Waters.
7

8 **Claim 34** reads as follows:
9

10 34. (Previously Presented) A blending method comprising:
11 defining a set of examples that pertain to a form or motion that is to be
12 animated, the examples being provided relative to a multi-dimensional abstract
13 space defined by at least one of an adjective and an adverb;
14 examining a plurality of forms or motions that are animated within the
15 abstract space from the defined set of examples;
16 identifying at least one form or motion that is undesirable;
17 selecting a form or motion from a location within the abstract space that is
18 proximate a location that corresponds to the undesirable form or motion; and
19 replacing the undesirable form or motion with the selected form or motion
20 to provide a pseudo-example that constitutes a linear sum of the examples of the
21 set of examples.
22

23 The Office suggests that this concept of an undesirable form is shown in
24 Figs. 16-22. The Applicants have reviewed the Waters reference, and in particular
25 Figs. 16-22, and can find no mention or suggestion whatsoever of an undesirable

1 form. The concept of an undesirable form is simply never discussed in Waters. As
2 such, Waters does describe the “identifying,” “selecting,” or “replacing” steps of
3 claim 34, each of which are made with some relation to an undesirable form.

4 Since Waters fails to teach or suggest all of elements of claim 34, Waters
5 does not and cannot anticipate claim 34. Claim 34 is believed to be allowable over
6 Waters, and such allowance is respectfully requested.

7 **Claims 35-38** each depend in some form from claim 34. As such, each of
8 claims 35-38 is necessarily allowable Waters by virtue of this dependency. Each
9 of claims 35-38 also specifies additional features that are not disclosed by Waters.
10

11
12 **Claim 39** reads as follows:

13 39. A blending method comprising:

14 defining at least two examples of a form in a multi-dimensional abstract
15 space, the multi-dimensional abstract space being defined by at least one of an
16 adjective and an adverb, a first of the example forms being defined in a first
17 position in the multi-dimensional abstract space and a second of the example
18 forms being defined in a second position in the multi-dimensional abstract space
19 that is different from the first position; and

20 computing a form in the first position such that when the computed form is
21 subjected to a transform blending operation that places the computed form in the
22 second position, it will match the second example form.
23

24 The Office states with respect to claim 39 that:
25

1 Walter [sic] in Fig. 10 illustrates the step of “defining at least two
2 examples of a form, in a multi-dimensional abstract space, the multi-
3 dimensional abstract space being defined by (Walter [sic] in Fig. 15
4 illustrates the step of “at least one of an adjective and an adverb”, a
5 first of the example forms being defined in a first position in the
6 multi-dimensional abstract space and a second of the example forms
7 being defined in a second position in the multi-dimensional abstract
8 space that is different from the first position; Walter [sic] in Figs. 8-
9 14 illustrates the broad step of “computing a form in the first
10 position such that when the computed form is subjected to a
11 transform blending operation that places the computed form in the
12 second position, it will match the second example form.”
13

14
15 Applicants respectfully disagree with all of the Office’s assertions with
16 respect to claim 39. With respect to the “defining” element of claim 38, it is not
17 clear at all what the Office is equating with the “at least two examples of a form”
18 recited in claim 38. Is the Office saying that the two muscles in Fig.10 are the at
19 least two examples of a form”? Or, is the Office saying that the two muscles are
20 part of a single form, such as on a head in Fig. 15, and that two of the heads are
21 the “at least two examples of a form”?
22

23 If the Office contends that the two muscles in Fig. 10 equate to the “at least
24 two examples of a form” recited in claim 39, it is important to note that there is
25

1 simply no discussion in Waters of computing a muscle in the position of the first
2 muscle such that when the first muscle is subjected to a transform blending
3 operation that places the first muscle in the position of the second muscle, it will
4 match the second muscle in form. Rather, Waters describes muscles storing
5 information about each other so that their contraction will not become isometric.

6 If, however, the Office saying that the two muscles are part of a single
7 form, such as on a head in Fig. 15, it is important to note that there is no
8 discussion whatsoever in Waters of computing a first head in the position of one of
9 the heads such that when the first head is subjected to a transform blending
10 operation that places the first head in the position of a second head, it will match
11 the second head in form. There is no discussion whatsoever in Waters of blending
12 heads. Rather, each of the heads in Fig. 15 is apparently a separately derived
13 example of facial expression. There is no discussion in Waters of moving from
14 one facial expression to another using two of these heads.
15

16
17 Simply put, there is no discussion whatsoever in Waters of computing a
18 form in a first position such that when the computed form is subjected to a
19 transform blending operation that places the computed form in the second
20 position, it will match a second example form.

21 As Waters fails to teach or suggest all of the elements of claim 39, Waters
22 does not and cannot anticipate claim 39. Claim 39 is believed to be allowable over
23 Waters, and such allowance is respectfully requested.
24
25

1 **Claims 40-45** each depend in some form from claim 39. As such, each of
2 claims 40-45 is necessarily allowable Waters by virtue of this dependency. Each
3 of claims 40-45 also specifies additional features that are not disclosed by Waters.
4

5 **Claim 46** reads as follows:
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7 46. One of more computer-readable media having computer-readable
8 instructions thereon which, when executed by a computer, cause the computer to:

9 define at least two examples of a form in a multi-dimensional abstract
10 space, the multi-dimensional abstract space being defined by at least one of an
11 adjective and an adverb, a first of the example forms being defined in a first
12 position in the multi-dimensional abstract space and a second of the example
13 forms being defined in a second position in the multi-dimensional abstract space
14 that is different from the first position; and

15 compute a form in the first position such that when the computed form is
16 subjected to a transform blending operation that places the computed form in the
17 second position, it will match the second example form.

18 **Claim 46** recited a computer readable includes the same steps recited in
19 method claim 39. As such, claim 46 is believed to be allowable of Waters for the
20 same reasons set forth above with respect to Claim 39.
21

22
23 **CONCLUSION**

24 Claims 1-46 are believed to be in condition for allowance. Applicant
25 respectfully requests reconsideration and prompt issuance of the present

1 application. Should any issue remain that prevents immediate issuance of the
2 application, the Examiner is encouraged to contact the undersigned attorney to
3 discuss the unresolved issue.
4

5 Respectfully Submitted,

6
7 Dated: 2/23/04
8

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